

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 31 May 2001 (31.05.01)	
International application No. PCT/DK00/00532	Applicant's or agent's file reference 17391 PCT
International filing date (day/month/year) 28 September 2000 (28.09.00)	Priority date (day/month/year) 28 September 1999 (28.09.99)
Applicant THOMSEN, Kurt, Elith	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
 24 April 2001 (24.04.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Charlotte ENGER Telephone No.: (41-22) 338.83.38
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PCT INTERNATIONAL COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

LARSEN & BIRKEHOLM A/S
Skandinavisk Patentbureau
Banegårdspladsen 1
DK-1570 Copenhagen V
DANEMARK

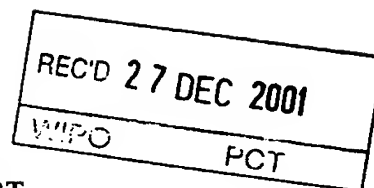
Date of mailing (day/month/year) 31 January 2002 (31.01.02)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 17391 PCT	
International application No. PCT/DK00/00532	International filing date (day/month/year) 28 September 2000 (28.09.00)

1. The following indications appeared on record concerning: <input checked="" type="checkbox"/> the applicant <input type="checkbox"/> the inventor <input type="checkbox"/> the agent <input type="checkbox"/> the common representative		
Name and Address	State of Nationality	State of Residence
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	
2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning: <input checked="" type="checkbox"/> the person <input type="checkbox"/> the name <input checked="" type="checkbox"/> the address <input type="checkbox"/> the nationality <input type="checkbox"/> the residence		
Name and Address A2SEA A/S Prinsessegade 46 DK-7000 Fredericia Denmark	State of Nationality DK	State of Residence DK
	Telephone No.	
	Facsimile No.	
	Teleprinter No.	
3. Further observations, if necessary: A2SEA A/S has been added to the records as applicant only for all designated States except US. THOMSEN, Kurt, Elith is now applicant/inventor for US only.		
4. A copy of this notification has been sent to: <input checked="" type="checkbox"/> the receiving Office <input type="checkbox"/> the designated Offices concerned <input type="checkbox"/> the International Searching Authority <input checked="" type="checkbox"/> the elected Offices concerned <input type="checkbox"/> the International Preliminary Examining Authority <input type="checkbox"/> other:		

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Anne KARKACHI Telephone No.: (41-22) 338.83.38
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



12

Applicant's or agent's file reference 17391 PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/DK00/00532	International filing date (day/month/year) 29.09.2000	Priority date (day/month/year) 28.09.1999
International Patent Classification (IPC) or national classification and IPC ₇ B63B 27/00, B63B 35/00		
Applicant Thomsen, Kurt Elith		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 24.04.2001	Date of completion of this report 12.12.2001
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 89	Authorized officer Douglas Elliot/LS Telephone No. 08-782 25 00

I. Basis of the report**1. With regard to the elements of the international application:***

- ☐ the international application as originally filed
- ☒ the description:
pages 1-9, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☒ the claims:
pages _____, as originally filed
pages _____, as amended (together with any statement) under article 19
pages _____, filed with the demand
pages 11-12, filed with the letter of 12.10.2001
- ☒ the drawings:
pages 1-5, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language English which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☒ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheet/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2 (c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/DK00/00532

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	<u>1-8</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-8</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-8</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Documents cited in the International Search Report:

D1: US 4 473 256

D2: US 4 465 012

D1, the closest prior art, discloses a vessel, which is used as a chisel barge. The vessel is equipped with supporting legs to maintain the position of the hull in a fixed location. The supporting legs can move vertically in consoles, which are connected to the deck of the vessel. Furthermore, the vessel has wire winches and hydraulic systems to control the height of the legs. The vessel is also divided into internal bulkheads spaced along the length and width of the hollow interior.

Claim 1 differs from D1 in that the consoles are connected to the hull's right and left long side instead of the corners. Furthermore, a crane not mentioned in D1 is used for handling and placing the structures below the waterline.

The invention according to claims 1-8 is thus novel, considered to involve an inventive step and have industrial applicability.

REPLACED BY
ART 34 AMDT

PATENT CLAIMS

1. Vessel (1), preferably a ship, for transport and mounting of structures, said vessel (1) comprising a hull (2) and at least four vertically elevational support legs (9) as well as displacement means for elevating the support legs (9) **characterized** in that the support legs (9) are mounted in at least two consoles (5) which by first means are connected to the hull's (2) right and left long side, respectively, and where the vessel (1) also comprises at least one auxiliary structure, preferably a crane (11), for handling and placing the structures below the waterline.
2. Vessel according to claim 1, **characterized** in that the consoles (5) comprise at least one sleeve (14) coated with a friction reducing substance on the inner surfaces of the sleeves, said inner surfaces enclosing parts of the outer circumference of a support leg (9).
3. Vessel according to any of the preceding claims **characterized** in that the displacement means comprise at least one wire winch (8) attached to each support leg (9) and a hydraulic system attached thereto.
4. Vessel according to any of the preceding claims **characterized** in that the support legs each comprise load cells (13).
5. Vessel according to any of the preceding claims **characterized** in that there are provided hollow spaces/chambers (12) in the hull (2), said hollow spaces/chambers being filled with/emptied for water via a control system.
6. Vessel according to any of the preceding claims **characterized** in that upper end surface of the consoles (5) is placed on a level with the deck (4) of the vessel.

7. Vessel according to any of the preceding claims **characterized** in that lower end surface of the consoles (5) is placed at a considerable distance to the ship's waterline and between same and the ship's bottom.

5

8. Vessel according to any of the preceding claims **characterized** in that the first means comprise a rail secured to the hull and fastening means, for example bolts.

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
5 April 2001 (05.04.2001)

PCT

(10) International Publication Number
WO 01/23252 A1

(51) International Patent Classification⁷: **B63B 27/00**,
35/00

(74) Agent: **LARSEN & BIRKEHOLM A/S**; Skandinavisk
Patentbureau, Banegårdspladsen 1, DK-1570 Copenhagen
V (DK).

(21) International Application Number: **PCT/DK00/00532**

(22) International Filing Date:
28 September 2000 (28.09.2000)

(25) Filing Language: Danish

(26) Publication Language: English

(30) Priority Data:
PA 1999 01372 28 September 1999 (28.09.1999) DK
PA 2000 00805 18 May 2000 (18.05.2000) DK

(71) Applicant and

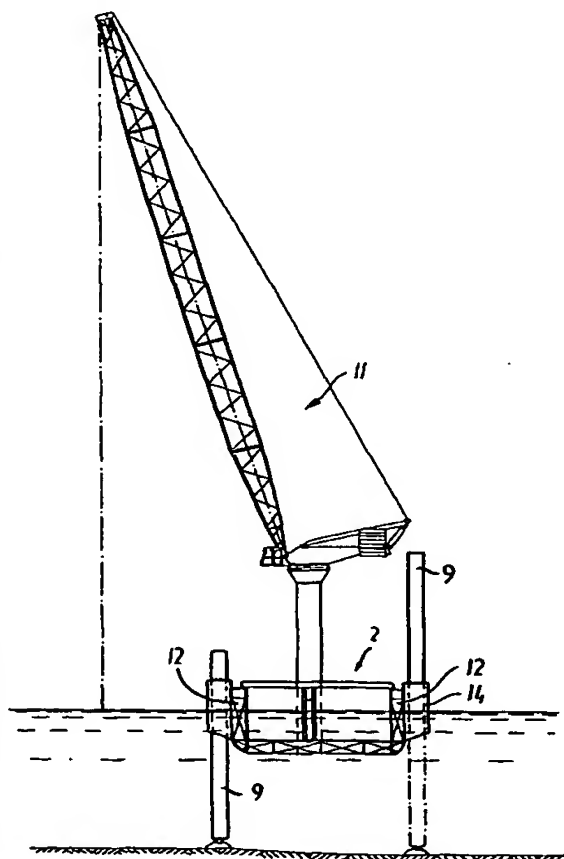
(72) Inventor: **THOMSEN, Kurt, Elith [DK/DK]**; Skansevej
3, DK-7000 Fredericia (DK).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AT
(utility model), AU, AZ, BA, BB, BG, BR, BY, BZ, CA,
CH, CN, CR, CU, CZ, CZ (utility model), DE, DE (utility
model), DK, DK (utility model), DM, DZ, EE, EE (utility
model), ES, FI, FI (utility model), GB, GD, GE, GH, GM,
HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KR (utility
model), KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG,
MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD,
SE, SG, SI, SK, SK (utility model), SL, TJ, TM, TR, TT,
TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,

[Continued on next page]

(54) Title: **VESSEL**



(57) Abstract: A vessel (1), preferably a ship, for transport and mounting of structures, said vessel (1) comprising a hull (2) and at least four vertically elevational support legs (9) as well as displacement means for elevating the support legs (9). The support legs (9) are mounted in at least two consoles (5) which by first means are connected to the hull's (2) right and left long side, respectively, and where the vessel (1) also comprises at least one auxiliary structure, preferably a crane (11), for handling and placing the structures below the waterline. The result is a vessel which based on an existing vessel, i.e. complete with all gear, makes it possible to transport windmills and mount these mills on previously built structures on the seabed, and where the windmill erection it self will take place under the same conditions on land, and where the mounting may take place via cargo ships of the self-supplying type. The ship is in other words a unit which can handle of all tasks comprising loading of the mill units, transport of several mill units to the mounting site, including lifting thereof from the cargo ship and lowering thereof to the preinstalled base on the seabed.

WO 01/23252 A1



IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *With international search report.*

INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 00/00532

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B63B 27/00, B63B 35/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: B63B, E02B, B66C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4473256 A (COLLINS), 25 Sept 1984 (25.09.84), column 2, line 50 - column 3, line 3; column 10, line 25 - line 33, figure 1	1-5
A	--	6-8
A	US 4465012 A (BOS), 14 August 1984 (14.08.84) -----	1

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

21 December 2000

Date of mailing of the international search report

10-01-2001

Name and mailing address of the ISA

Swedish Patent Office

Box 5055, S-102 42 STOCKHOLM

Facsimile No. + 46 8 666 02 86

Authorized officer

Christer Jönsson/js

Telephone No. + 46 8 782 25 00

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/DK 00/00532

Patent document cited in search report			Publication date	Patent family member(s)	Publication date
US	4473256	A	25/09/84	NONE	
<hr/>					
US	4465012	A	14/08/84	DE 3204177 A	23/09/82
				GB 2092530 A,B	18/08/82
				JP 57182591 A	10/11/82
				NL 8100610 A	01/09/82
<hr/>					

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REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only	
International Application No.	PCT/DK 00/00532
International Filing Date	28 SEPTEMBER 2000
<div style="display: flex; justify-content: space-between;"> <div> </div> <div> Danish Patent and Trademark Office PCI-International Application Name of receiving Office and "PCT International Application" </div> </div>	
Applicant's or agent's file reference (if desired) (12 characters maximum) 17391 PCT	

Box No. I TITLE OF INVENTION <div style="text-align: center; padding: 10px;">WESSEL.</div>	
Box No. II APPLICANT	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.) <div style="padding-left: 40px;"> THOMSEN, Kurt Elith Skansevej 3 DK-7000 Fredericia Denmark </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> <input checked="" type="checkbox"/> This person is also inventor. </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> Telephone No. </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> Facsimile No. </div> <div style="border: 1px solid black; padding: 5px;"> Teleprinter No. </div>
State (that is, country) of nationality: <div style="text-align: center;">DK</div>	State (that is, country) of residence: <div style="text-align: center;">DK</div>
This person is applicant for the purposes of: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input checked="" type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box </div>	
Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.) 	This person is: <div style="margin-bottom: 10px;"> <input type="checkbox"/> applicant only </div> <div style="margin-bottom: 10px;"> <input type="checkbox"/> applicant and inventor </div> <div> <input type="checkbox"/> inventor only (If this check-box is marked, do not fill in below.) </div>
State (that is, country) of nationality:	State (that is, country) of residence:
This person is applicant for the purposes of: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="checkbox"/> all designated States <input type="checkbox"/> all designated States except the United States of America <input type="checkbox"/> the United States of America only <input type="checkbox"/> the States indicated in the Supplemental Box </div>	
<input type="checkbox"/> Further applicants and/or (further) inventors are indicated on a continuation sheet.	
Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE	
The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: <div style="display: flex; justify-content: flex-end; margin-top: 5px;"> <input checked="" type="checkbox"/> agent <input type="checkbox"/> common representative </div>	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) <div style="padding-left: 40px;"> LARSEN & BIRKEHOLM A/S Skandinavisk Patentbureau Banegårdspladsen 1 DK-1570 Copenhagen V Denmark </div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> Telephone No. <div style="text-align: center;">+45 33 13 09 30</div> </div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 5px;"> Facsimile No. <div style="text-align: center;">+45 33 13 09 34</div> </div> <div style="border: 1px solid black; padding: 5px;"> Teleprinter No. </div>
<input type="checkbox"/> Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.	

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes; at least one must be marked):

Regional Patent

- ☒ AP **ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, MZ Mozambique, SD Sudan, SL Sierra Leone, SZ Swaziland, TZ United Republic of Tanzania, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ EA **Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ EP **European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ OA **OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

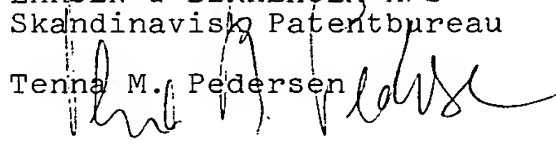
National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | |
|--|--|
| <input checked="" type="checkbox"/> AE United Arab Emirates | <input checked="" type="checkbox"/> LC Saint Lucia |
| <input checked="" type="checkbox"/> AG Antigua and Barbuda | <input checked="" type="checkbox"/> LK Sri Lanka |
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> LR Liberia |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> LS Lesotho |
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| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> LU Luxembourg |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> LV Latvia |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina | <input checked="" type="checkbox"/> MA Morocco |
| <input checked="" type="checkbox"/> BB Barbados | <input checked="" type="checkbox"/> MD Republic of Moldova |
| <input checked="" type="checkbox"/> BG Bulgaria | <input checked="" type="checkbox"/> MG Madagascar |
| <input checked="" type="checkbox"/> BR Brazil | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> MN Mongolia |
| <input checked="" type="checkbox"/> BZ Belize | <input checked="" type="checkbox"/> MW Malawi |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> MX Mexico |
| <input checked="" type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> MZ Mozambique |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> NO Norway |
| <input checked="" type="checkbox"/> CR Costa Rica | <input checked="" type="checkbox"/> NZ New Zealand |
| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> CZ Czech Republic ..and utility model..... | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> DE Germany | <input checked="" type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> DK Denmark | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> DM Dominica | <input checked="" type="checkbox"/> SD Sudan |
| <input checked="" type="checkbox"/> DZ Algeria | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> EE Estonia | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> SI Slovenia |
| <input checked="" type="checkbox"/> FI Finland | <input checked="" type="checkbox"/> SK Slovakia ..and utility model..... |
| <input checked="" type="checkbox"/> GB United Kingdom | <input checked="" type="checkbox"/> SL Sierra Leone |
| <input checked="" type="checkbox"/> GD Grenada | <input checked="" type="checkbox"/> TJ Tajikistan |
| <input checked="" type="checkbox"/> GE Georgia | <input checked="" type="checkbox"/> TM Turkmenistan |
| <input checked="" type="checkbox"/> GH Ghana | <input checked="" type="checkbox"/> TR Turkey |
| <input checked="" type="checkbox"/> GM Gambia | <input checked="" type="checkbox"/> TT Trinidad and Tobago |
| <input checked="" type="checkbox"/> HR Croatia | <input checked="" type="checkbox"/> TZ United Republic of Tanzania |
| <input checked="" type="checkbox"/> HU Hungary | <input checked="" type="checkbox"/> UA Ukraine |
| <input checked="" type="checkbox"/> ID Indonesia | <input checked="" type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> IN India | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> IS Iceland | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> JP Japan | <input checked="" type="checkbox"/> YU Yugoslavia |
| <input checked="" type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> ZA South Africa |
| <input checked="" type="checkbox"/> KG Kyrgyzstan | <input checked="" type="checkbox"/> ZW Zimbabwe |
| <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | |
| <input checked="" type="checkbox"/> KR Republic of Korea ..and utility model..... | |
| <input checked="" type="checkbox"/> KZ Kazakhstan | <input type="checkbox"/> |

Check-box reserved for designating States which have become party to the PCT after issuance of this sheet:

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation (including fees) must reach the receiving Office within the 15-month time limit.)

Sheet No. 3

Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.		
Filing date of earlier application (day/month/year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application: regional Office	international application: receiving Office
item (1) 28 September 99 (28.09.99)	PA 1999 01372	DK		
item (2) 18 May 2000 (18.05.00)	PA 2000 00805	DK		
item (3)				
<input checked="" type="checkbox"/> The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s): 1) + 2)				
<i>* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.</i>				
Box No. VII INTERNATIONAL SEARCHING AUTHORITY				
Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):		Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority): Date (day/month/year) Number Country (or regional Office)		
ISA/ SE				
Box No. VIII CHECK LIST; LANGUAGE OF FILING				
This international application contains the following number of sheets: request : 3 description (excluding sequence listing part) : 9 claims : 2 abstract : 1 drawings : 5 sequence listing part of description : Total number of sheets : 20		This international application is accompanied by the item(s) marked below: 1. <input checked="" type="checkbox"/> fee calculation sheet 2. <input type="checkbox"/> separate signed power of attorney 3. <input type="checkbox"/> copy of general power of attorney; reference number, if any: 4. <input type="checkbox"/> statement explaining lack of signature 5. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s): 6. <input type="checkbox"/> translation of international application into (language): 7. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material 8. <input type="checkbox"/> nucleotide and/or amino acid sequence listing in computer readable form 9. <input type="checkbox"/> other (specify):		
Figure of the drawings which should accompany the abstract: 2		Language of filing of the international application: Danish		
Box No. IX SIGNATURE OF APPLICANT OR AGENT				
Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request). <div style="text-align: center;"> Copenhagen, 27 September 2000 LARSEN & BIRKEHOLM A/S Skandinavisk Patentbureau  Tenna M. Pedersen </div>				

For receiving Office use only		2. Drawings: <input type="checkbox"/> received: <input type="checkbox"/> not received:
1. Date of actual receipt of the purported international application:	RO/DK 28 SEP 2000 (28.09.2000)	
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4. Date of timely receipt of the required corrections under PCT Article 11(2):		
5. International Searching Authority (if two or more are competent): ISA/ SE	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid.	

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Date of receipt of the record copy by the International Bureau:	10 OCTOBER 2000 (10.10.00)

1/5

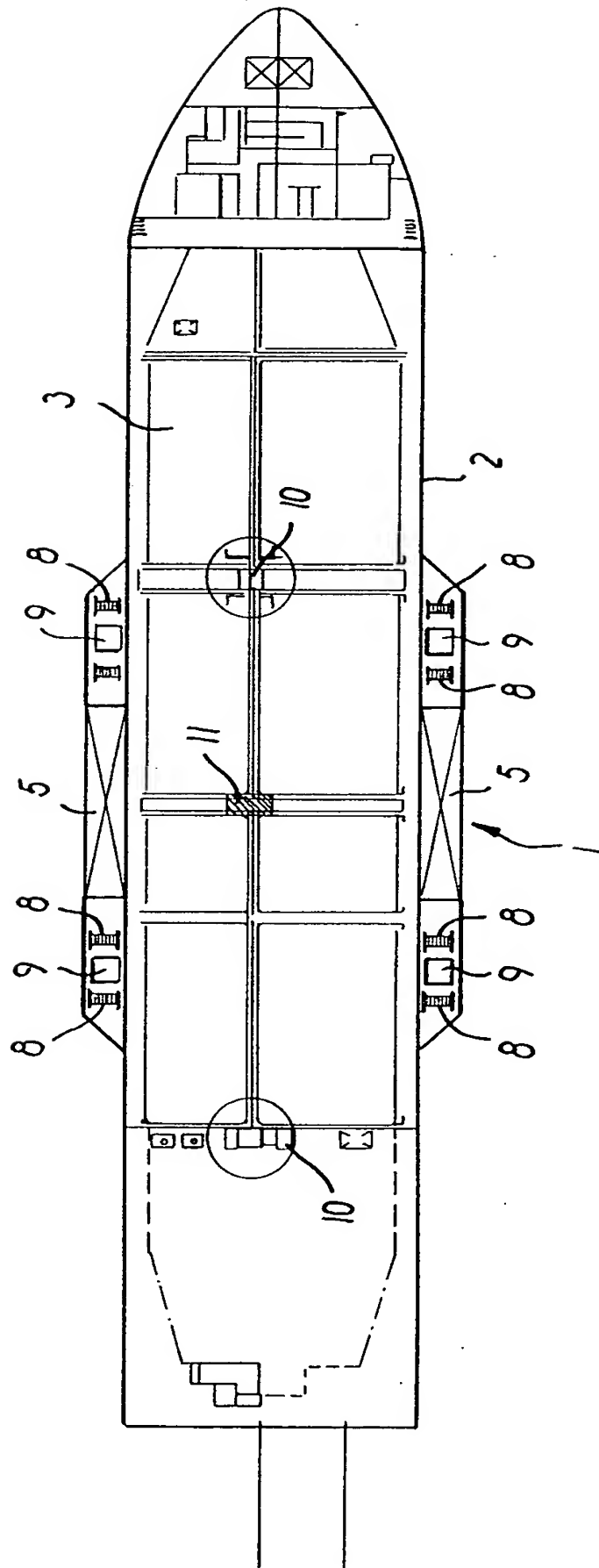


FIG. 1

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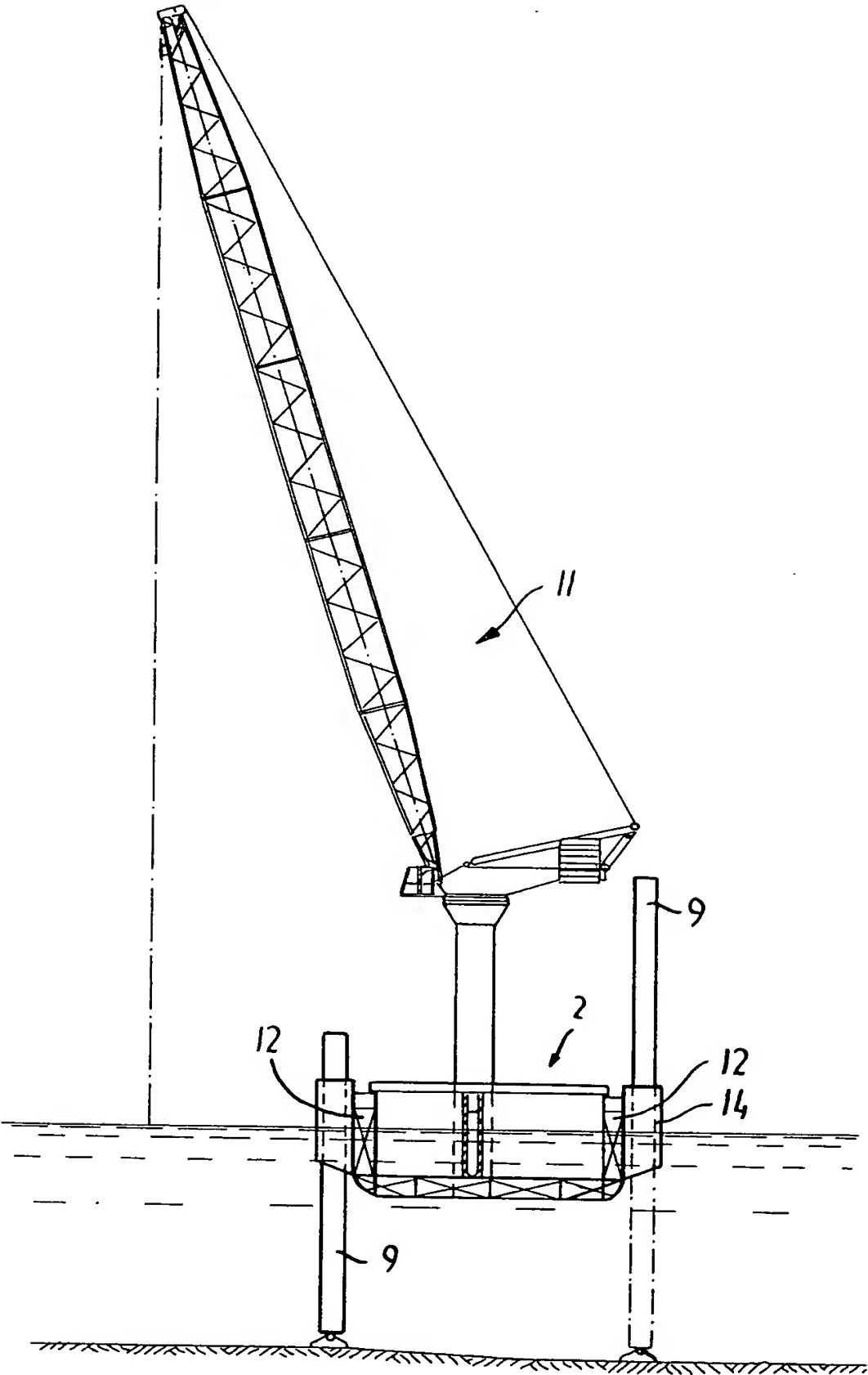


FIG.2

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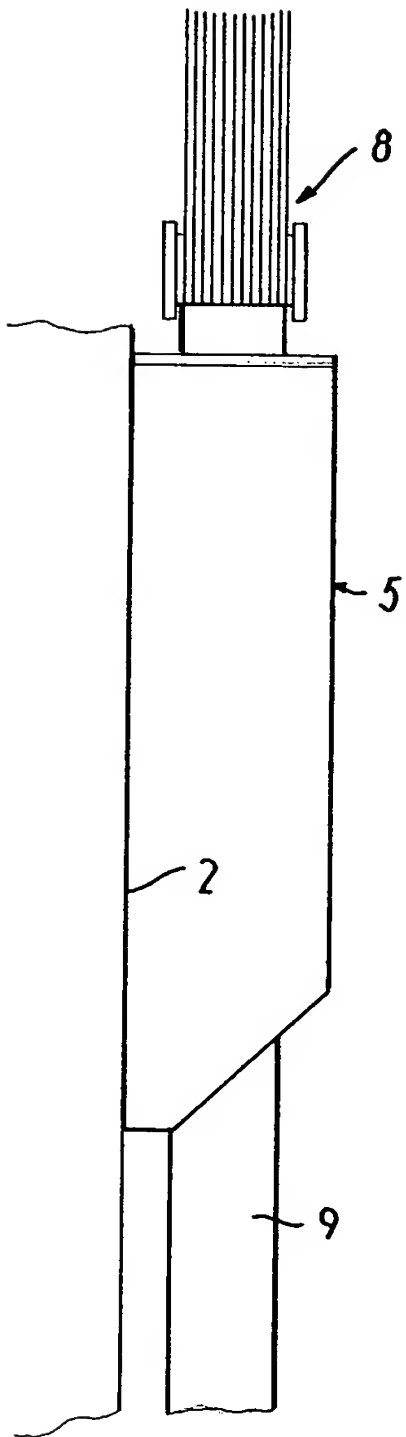


FIG. 3

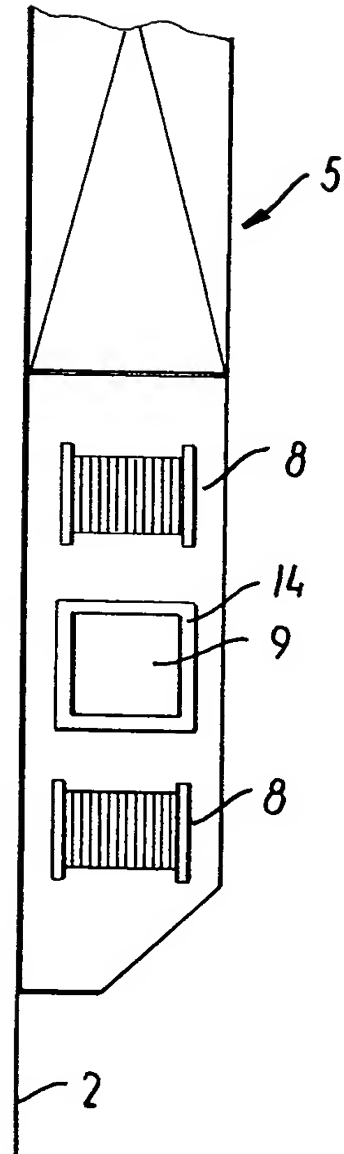
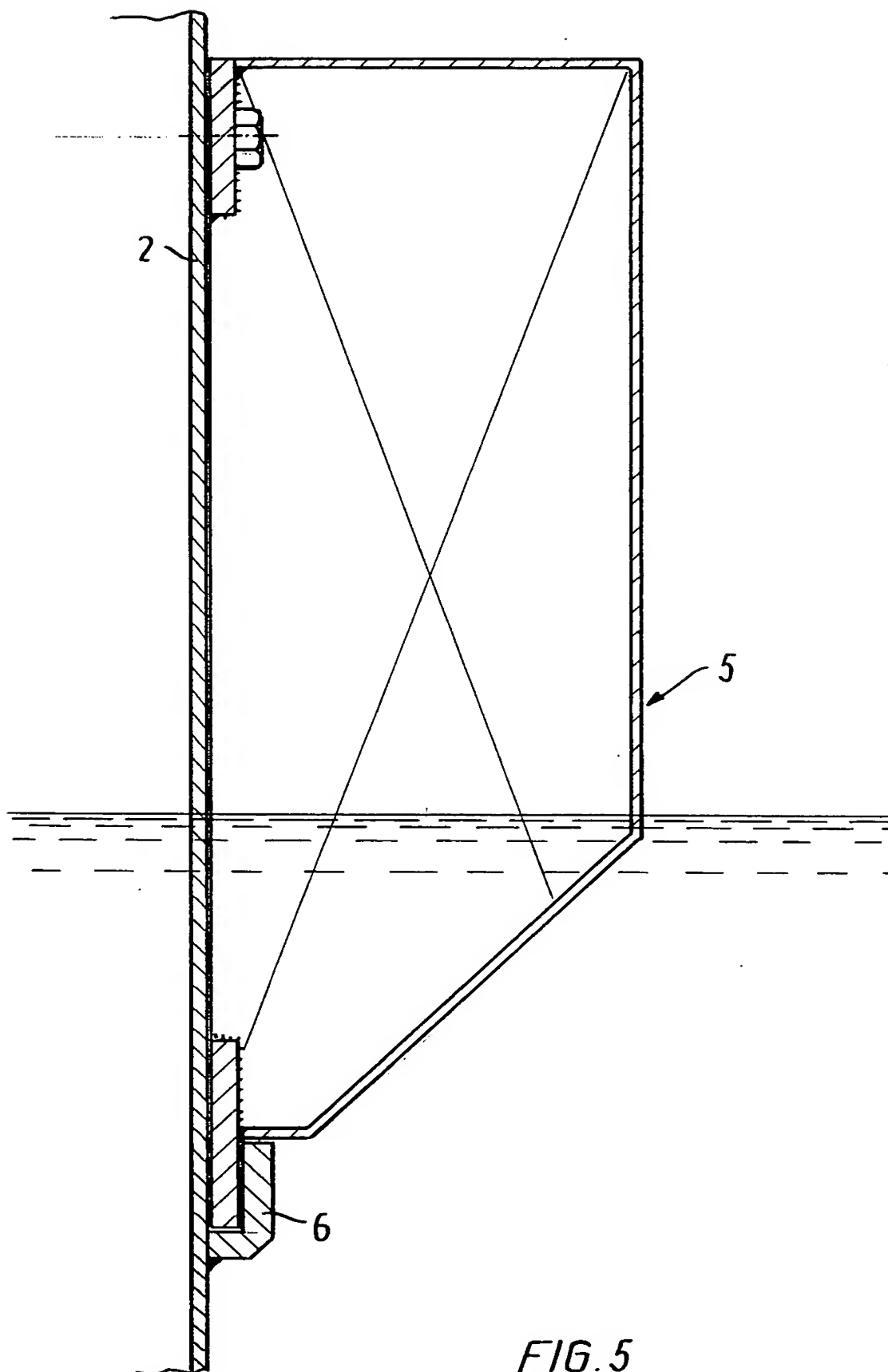


FIG. 4

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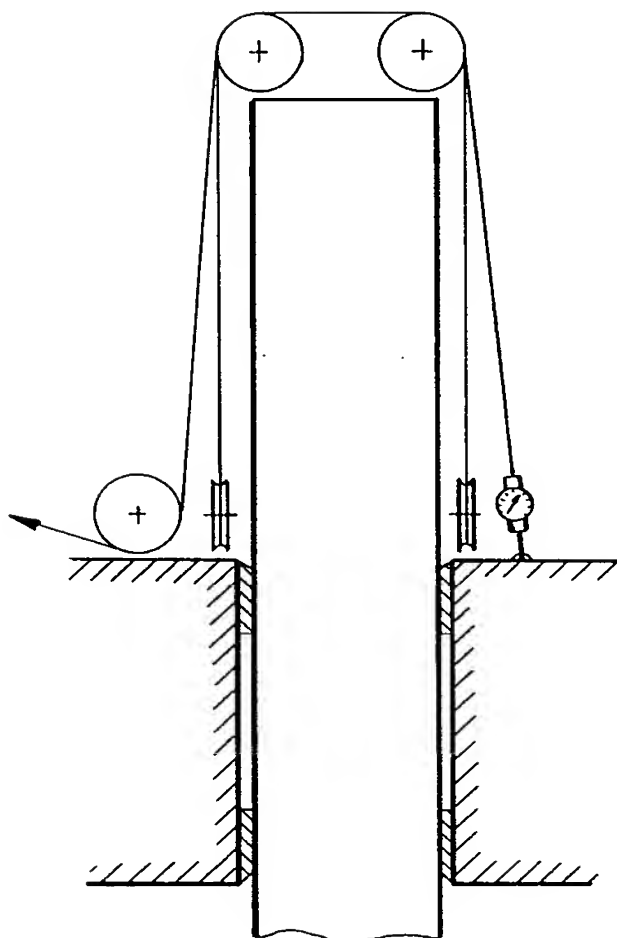


FIG. 6a

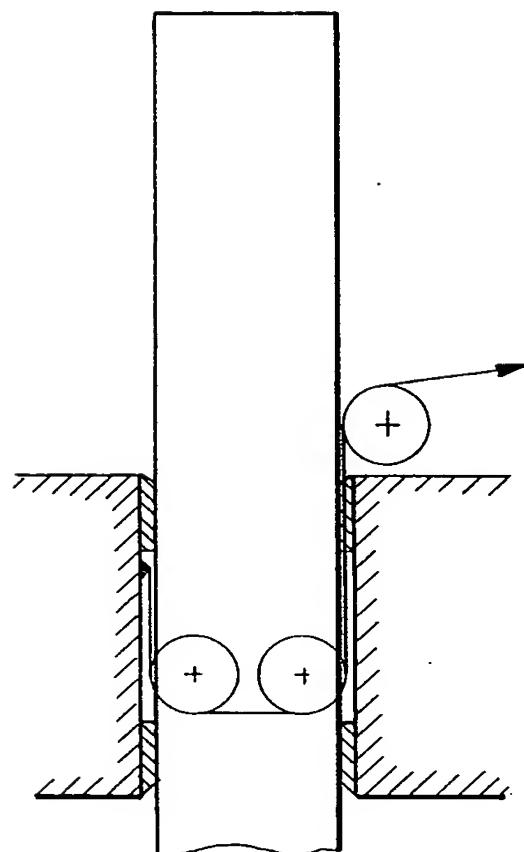


FIG. 6c

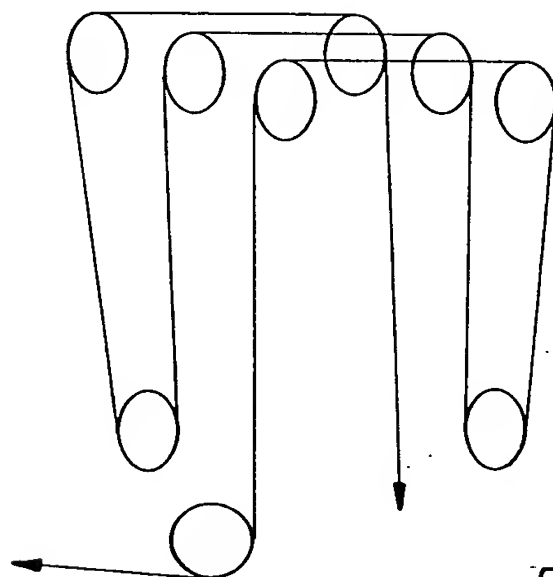


FIG. 6b

FARTØJ

Opfindelsen angår et fartøj, fortrinsvis et skib, for transport og montage af konstruktioner, hvilket fartøj omfatter et skrog samt mindst fire vertikalt forskydelige støtteben samt forskydningsmidler til forskydning af støttebenene.

Et sådant fartøj kendes eksempelvis fra GB-A-2.120.607. I dette skrift beskrives et skib, der benyttes til installation af store off shore-konstruktioner. Skibet er udstyret med fire forskydelige ben samt en skinneanordning på skibets dæk. Imidlertid er skibet specialkonstrueret i den forstand, at de fire forskydelige støtteben udgør en integreret del af fartøjet og således er etableret tværs igennem dettes dæk. Yderligere bemærkes, at skinnekonstruktionen medfører, at skibet kun er anvendeligt, hvor en konstruktion skydes ud fra dækket og skal etableres på en platform i niveau med dækkets plan.

I forbindelse med montage af vindmøller off shore er det yderligere kendt at lade disse transportere via en jack-up, som slæbes ud eller som eventuelt kan sejle selv, og hvor der kun kan medtages én mølle ad gangen, og hvor farten på transportenheden er stærkt begrænset. Ligeledes er en sådan jack-up meget følsom over for vindforhold, hvorfor det udelukkende er muligt at opsætte møllerne, dels relativt tæt på land, dels i relativt stille vejr.

Formålet med nærværende opfindelse er at tilvejebringe et fartøj, der med udgangspunkt i et eksisterende fartøj, d.v.s. med alt hvad dertil hører, gør det muligt at transportere vindmøller samt montere disse møller på forud anlagte konstruktioner på havbunden, og hvor selve vindmøllerejsningen vil ske under samme betingelser på land, og hvor opsætningen kan finde sted via fragtskibe, som er af self supplying-typen. Skibet udgør med andre ord en enhed, der er i stand til at varetage alt omfattende lastning af mølleenhederne, transport af flere mølleenheder til opsætningsstedet, herunder rejsning af denne fra fragtskibet og nedsenkning til den på havbunden formonterede sokkel.

Skibet er således et fragtskib, fortrinsvis et containerskib eller en bulk carrier, til hvilken der er foretaget visse tilbygninger. Fragtskibet udmærker sig ved dels at kunne rumme en stor last, hvilket i dette tilfælde vil sige op til 10 vindmøller, men derudover er den også meget stærkt søgående og vil kunne skyde en god fart, ligesom et sådant fragtskib rummer de til besætningen nødvendige faciliteter.

Formålet med opfindelsen opnås med et fartøj af den i indledningen angivne art, og hvor tillige støttebenene monteres i mindst to konsoller, der ved første midler er forbundet hhv. til skrogets højre og venstre langside, og hvor fartøjet tillige omfatter mindst én hjælpekonstruktion, fortrinsvis en kran, for håndtering og placering af konstruktionerne under vandlinien.

Systemet fungerer således ved, at der på kendte fartøj fastgøres de nævnte konsoller ved hjælp af første midler, der eksempelvis kan være en skinneanordning, således som det i øvrigt er angivet i krav 8. Gennem hver konsol er der monteret en fortrinsvis to forskydelige ben, hvilke ben sikrer, at skibet bliver stående stille, selv i høj sø. Det bemærkes, at i forbindelse med håndtering af vindmøllerne vil der ske en låsning af benene, i og med at skibet hæves til det nødvendige niveau, hvorefter der sker en blokering, idet en høj sø ellers vil give anledning til ustabilitet under håndteringen af møllerne. Ved hjælp af selve kranen er det således muligt at håndtere de store vindmøller, og hvor der på dækket yderligere kan være monteret yderligere hjælpekrane, som sikrer lastningen til og fra kajen.

Ved at tilvejebringe et fartøj ifølge opfindelsen, og som yderligere angivet i krav 2, opnås, at støttebenene glider relativt friktionsløst i den manchete, som omslutter støttebenene delvist. Manchetten kan som angivet være belagt med det friktionsnedsættende middel i form af fortrinsvis teflon, eller støttebenene kan være belagt med teflon for samme funktion. Benene er i øvrigt tilpasset manchetten via en glidepasning, idet det er væsentligt, at der ikke er for stort et spil mellem manchete og støtteben.

Ved at tilvejebringe et fartøj ifølge opfindelsen, og som yderligere angivet i krav 3, opnås en hensigtsmæssig måde at justere den vertikale position af støttebenene på, idet det hydrauliske system sørger for, at der er det rette tryk på støttebenene. I øvrigt bemærkes, at hvert støtteben fortrinsvis har to wirespil monteret på hver sin side af dette. Antallet af vinger på wirespillet angiver udvekslingsforholdet, hvor der fortrinsvis foretrækkes en udveksling på 9, således at når wirespillet tilvejebringer en 35 tons belastning, vil trykket, som tilvejebringes via en hydraulisk station på hvert støtteben, kunne andrage op til ca. 300 tons.

Ved at tilvejebringe et fartøj ifølge opfindelsen, og som yderligere angivet i krav 4, opnås, at trykket på hvert enkelt støtteben måles og angives via vejecellen.

Ved at tilvejebringe et fartøj ifølge opfindelsen, og som yderligere angivet i krav 5, opnås mulighed for at justere vægten, således at når et hjørne udøver et stort tryk på vejecellerne, således som de er angivet i krav 4, vil disse sende besked til styresystemet om at ændre trykket diagonalt modsat denne enhed. Dette finder sted ved, at der i dette hjørne fjernes væske fra kamrene, og at der i det diagonalt modsatte hjørne indpumpes væske, således at der opnås en form for ligevægt, og der kompenseres for den lastevægt, der flyttes. Dette antiheelingsystem kan være aktivt, både når skibet flyder, og når det er forankret på havbunden via støttefødderne. I førstnævnte tilfælde vil en væskeføler og gyrofunktion registrere krængninger af skibet, og der sendes signal fra føleren til antiheelingsystemet, hvorved skibets stabilitet sikres.

I sidstnævnte tilfælde, hvor væskefølerne er sat ud af funktion, vil de på støttebenene monterede vejeceller registrere ethvert tryk samt enhver trykændring på støttebenene, når en last flyttes, og signalere dette til antiheelingsystemet, der således aktiveres og kompenserer for trykforskellene.

Ved at tilvejebringe et fartøj ifølge opfindelsen, og som yderligere angivet i krav 6

og 7, opnås en hensigtsmæssig udstrækning af selve konsollen, således at der opnås en god styring af støttebenene i den langsgående manchete, som er at finde inde i konsollen, eller som finder sted ved hjælp af de udsavninger, som er i konsollens øvre og nedre flade til frembringelse af en udsæring, gennem hvilken støttebenene kan glide.

Ved at tilvejebringe et fartøj ifølge opfindelsen, og som yderligere angivet i krav 8, opnås, at konsollen udgør en aftagelig enhed, som således kan demonteres/påmonteres det kendte fartøjs konstruktioner.

Opfindelsen vil nu blive forklaret nærmere under henvisning til tegningen, hvor

fig. 1 viser set fra oven i snit et skib med påmonteret tank/påmonterede konsoller med støtteben og påmonterede kraner,

fig. 2 viser i tværsnit en kran monteret på et skib,

fig. 3 viser støttebenets placering i relation til tanken/konsollen samt det tilhørende spil,

fig. 4 viser set fra oven den i fig. 3 viste tank/konsol med spil og støtteben,

fig. 5 viser et tværsnit gennem tanken med støtteben og påmonteret skibssiden,

fig. 6A-C viser samspil mellem wiretræk og støtteben.

Fig. 1 viser et skib 1 set fra oven, omfattende et skrog 2, et dæk 3, på hvilket dæk to mindre hjælpekraner 10 er placeret. På hver sin side af skroget er anbragt en konsol 5, i hvilken støtteben 9 er anlagt, fortrinsvis to støtteben i hver

ende af konsollen. Støttebenene er på hver side tilknyttet et spil med wire 8, hvilket wirespil via et hydraulisk system sørger for det rette tryk på støttebenene 9.

5 Støttebenenes søjler er rektangulære og ender med en fod i størrelsesordenen 10 m² og er i øvrigt fremstillet efter kendte principper.

Selve foden i form af en plade er kardansk ophængt, således at hældningen tilpasses havbundens hældning. Støttefoddernes areal kan udvides, idet de er aftageligt monteret på støttebenene.

10 Mellem hvert par beliggende over for hinanden er på hver side af skroget beliggende en stor kran 11, hvilken kran er i stand til at løfte og montere vindmøller på et på havbunden forud etableret fundament.

15 Yderligere omfatter skibet yderligere kraner 10, idet det på fragtskibe er kendt med mindre kraner, der er beliggende i hver ende af skibet, hvilke kraner kan bruges til almindelig lastning, og som i øvrigt i pågældende tilfælde kan benyttes under selve nedsænkningen af møllen, idet disse virker som styr for møllevingerne.

20 Skibet omfatter en stor kran, hvilken kran har en lasteevne på ca. 450 tons. Denne kran er taget fra kendte, såkaldte larvefodskraner, hvor den bevægelige del fjernes, og kranen monteres således stationært på skibets dæk, idet denne er beliggende midt i skibets længderetning, fortrinsvis midt imellem to over for hinanden og på hver side af skroget beliggende støtteben, men dog forskudt eller forskydelig til den ene eller anden side af skibets længdeside. Der etableres på skibet et 12 meter højt tårn, på hvilket kranen stilles, hvorved kranen når en højde, som gør det muligt at håndtere de voldsomt høje vindmøller.

25 30 Fig. 2 viser kranen 11 set fra siden, idet det her fremgår, at denne er forskudt mod en af skrogets langsider. Fig. 2 viser også lommer i selve skrogets sider,

hvilke lommer 12 udgør en del af antiheelingsystemet, og som også kan tilknyttes funktionen af den store kran 11. Antiheelingsystemet er primært indbygget for at foretage en modvægt mod de mindre kraners momentpåvirkning under arbejde, idet disse kamre, som antiheelingsystemerne normalt samarbejder med, fyldes med vand diagonalt modsat den side, hvor en kran arbejder, således at skibet ikke kipper. Dette antiheelingsystem er således som noget nyt blevet aktiveret i forbindelse med anvendelsen af den store kran, idet der er indbygget et styresystem, som er koblet op til vejeceller placeret på støttebenene og eventuelt ved hver støttefod, og hvilke vejeceller registrerer ændringer i trykket på det enkelte ben. I de tilfælde, hvor en vejecelle eksempelvis angiver et tryk på et ben på omkring 350 tons og ændret f.eks. fra 200 tons, vil vejecellen sende besked til styresystemet om en ændring diagonalt modsat denne enhed, ved at der i 350 tons-hjørnet fjernes væske fra antiheelingsystemet, og at der i det diagonalt modsatte hjørne indpumpes væske, således at der opnås en form for ligevægt.

Systemet kan styres via et computerprogram, eller det kan håndteres rent manuelt. Det bemærkes, at skibet med de indbyggede støtteben samt kran er designet til at kunne arbejde i 3 meters faktisk bølgehøjde, hvilket svarer til 1 ½ meter signifikant bølge, idet det ved konstruktionen er væsentligt, at den kan holdes plan under de kræfter, der er ved et sådant bølgeforsvar. Det, der er bestemmende for, hvorvidt det er muligt at foretage en opsætning af en mølle, vil således ikke være søforholdene, men derimod de vindforhold, der gør sig gældende, og hvilke vindforhold vil være de samme, som er aktuelle på land.

I de tilfælde, hvor en faktisk bølgehøjde overstiger 3 m, vil kraften på et støtteben overstige 300 tons, hvorfor støttebenet med de dimensioner, der her er tale om, ikke vil kunne holdes stabilt. Støttebenet kan naturligvis ved at tilføre wirespillet flere vindinger opnå en højere trykeffekt, men dette er ikke relevant, idet en højere bølgegang vil være ensbetydende med en større vindstyrke, og hvor denne vindstyrke er for høj til, at vindmøllen vil kunne sættes på plads, idet vinden i så fald vil udøve for stor en kraft på selve vindmøllens vinger.

Derudover omfatter konstruktionen vejeceller 13, som er tilknyttet hvert støtteben 9, hvor hvert støtteben 9 i øvrigt er forløbende i en manchete 14 og belagt med teflon for en mindre friktionsmodstand.

5 Fig. 3 viser tanken/konsollen 5 set fra siden, og gennem hvilken et støtteben, fortrinsvis to, er placeret, hvor der til hvert støtteben er mindst ét, fortrinsvis to wirespil 8 tilknyttet. Dette ses yderligere angivet i fig. 4, hvoraf det fremgår, at konsollen 5 omslutter støttebenene 9 beliggende i deres manchete 14, og hvor der på hver side er de omtalte spil 8, medens fig. 5 viser et snit gennem konsol-
10 len 5, hvilken konsol er aftageligt monteret til skroget 2, idet der på skrogets langsider er fastsvejest en langsgående skinne 6, som er L- til V-formet, og i hvis reces en pladedel fra tanken griber ned, og hvor tanken foroven via en bolt 7 påmonteres fragtskibet. Gennem denne tank/konsol 5 er støttebenet 9 således anlagt. Tanken afsluttes foroven i niveau med dæk/ræling, medens den nederste
15 del ligger betragteligt under vandlinien. Skibet vil således under monteringen af en vindmølle på alle fire ben have et tryk på 300 tons, hvilket løfter skibet op, hvorefter spillet låses, således at en eventuel sø ikke giver anledning til ustabilitet. Hvis spillet ikke er låst, vil der via den funktion, der er knyttet til hvert ben, ske en udligning af trykket, således at ustabiliteten neutraliseres. Hvert ben har
20 en længde af ca. 20 m.

Fastgørelsen af konsollerne sker via en bolteforbindelse, som isættes skroget ud for hvert såkaldte Webspant, med en bolt på hver side.

25 Hulrummet mellem skroget og konsollerne på den skrå flade umiddelbart under dækniveau præpareres med Chokfast, et stærkt klæbende friktionsmiddel, som således overfører kræfter fra støtteben og konsoller til skroget over en betydeligt større bæreflade end ved udelukkende at bruge en bolteforbindelse, hvor kun snitkræfterne i boltesamlingen kan medregnes.

30 Selve skinneforbindelsen forneden på konsollerne er tilvejebragt for at holde

konsollerne i korrekt position hele tiden og fungerer derfor kun som hængsel, idet den forhindrer konsollerne i at vippe ud fra skroget. Den bærer således ikke skibet overhovedet.

- 5 Ved det ovenfor angivne produkt opnås, at skibet løftes så meget ud af vandet, at bølger indtil en vis størrelse ingen indflydelse har på skibet.

Alle andre systemer løfter den flydende genstand helt ud af vandet, med de ulemper, der hermed er forbundet, idet disse systemer, såkaldte jack-ups, er uhyre følsomme ved overgangen, hvor bunden af genstanden lige slipper eller møder havoverfladen, hvis der er bølger, således at det kan tage lang tid mellem flytning fra et operationssted til et andet, i dette tilfælde fra mølle til mølle, hvoraf der godt kan være planlagt opstilling af 50 møller.

- 15 Fig. 6A viser, hvorledes et wiretræk trykker benet mod bunden, den ene ende af wiren er fæstnet til støttebenet, og den anden monteret på et hydraulisk spil med automatisk tilspænding (tension), der normalt anvendes til fortøjningsspil på større skibe.

- 20 Når skibet er på positionen, sænkes benene ned på havbunden, og man løfter nu skibet så meget, at det ligger stille. Derefter stiller man spillene på tension, således at skibet kan følge tidevandet op og ned. Tilstrækkeligt løft vil normalt ligge på omkring 5% af skibets displacement. Når man kommer til selve den nøjagtige montering, låses benene, og benenes tryk styres med skibets trimsystem, således at krængningsmomentet fra byrden, der hænger i kranen, udlignes af ballastvand, der flyttes i modsat retning.

- 30 I praksis er antiheelingsystemet sat ud af spillet i samme øjeblik, støttebenene sættes ned. Dette sker, fordi systemet fungerer ved hjælp af impulser fra skibets krængningsfølere, således at det kompenserer ved at arbejde modsat de signaler, disse giver, men da skibet ikke krænger, får systemet ingen signaler.

Vejecellerne registrerer trykændringen, hvilket oplagres i en kontrolpult. Operatøren eller det administrative styresystem kontrollerer hele tiden trykket på hvert af de 4 ben og afgør dermed, om der skal ske en omfordeling af skibets ballast.

Disse følere omgås ved at montere vejeceller på hvert støtteben. Via en Ethernet forbindelse – da vejecellen giver et elektrisk signal i lighed med disse følere – kan skibets antiheelingsystem igen modtage impulser svarende til dem, som krængningsfølerne afgav. På denne måde kan antiheelingsystemet manipuleres til at tro, at skibet krænger, hvad det jo ikke gør, og kompenserer derved for den flyttede last.

Der er principielt ikke nogen forbindelse mellem spillene og vejecellerne, idet spillene er mooring spil, som fungerer ved, at der gives et konstant hydrauliktryk. Hvis modstanden i wiren falder, vil spillet begynde at hale ind, og omvendt, hvis modstanden i wiren stiger til mere end det hydrauliske tryk, må spillet lade wiren løbe udad, indtil det oprindelige tryk er etableret. Dette sker ved hjælp af en slags overtryksventil, som hhv. lukker og åbner for fremløb af olie.

Fig. 6B viser, hvorledes wiren skæres for tryk, men en kombination af spilstørrelse og antal skæringer kan tilpasses ethvert skib.

Tegningen, fig. 6C, viser løftesystemet, hvor det hydrauliske spil ligeledes er et tensionspil, men det er kun med den funktion, at wiren holdes stramt i alle situationer.

P A T E N T K R A V

1. Fartøj (1), fortrinsvis et skib, for transport og montage af konstruktioner, hvilket fartøj (1) omfatter et skrog (2) samt mindst fire vertikalt forskydelige støtteben (9) samt forskydningsmidler til forskydning af støttebenene (9),
5 k e n d e t e g n e t ved, at støttebenene (9) monteres i mindst to konsoller (5), der ved første midler er forbundet hhv. til skrogets (2) højre og venstre langside, samt at fartøjet (1) tillige omfatter mindst én hjælpekonstruktion, fortrinsvis en kran (11), for håndtering og placering af konstruktionerne under vandlinien.
10
2. Fartøj ifølge krav 1, k e n d e t e g n e t ved, at konsollerne (5) omfatter mindst én manchete (14) belagt med et friktionsnedsættende middel på manchetternes indre flader, hvilke indre flader omslutter dele af et støttebens (9) ydre omkreds.
15
3. Fartøj ifølge ethvert af de foregående krav, k e n d e t e g n e t ved, at forskydningsmidlerne omfatter mindst ét wirespil (8) forbundet til hvert støtteben (9) samt et dertil knyttet hydraulisk system.
20
4. Fartøj ifølge ethvert af de foregående krav, k e n d e t e g n e t ved, at støttebenene hver omfatter vejeceller (13).
5. Fartøj ifølge ethvert af de foregående krav, k e n d e t e g n e t ved, at der i skroget (2) er etableret hulheder/kamre (12), hvilke hulheder/kamre via et styresystem fyldes med/tømmes for vand.
25
6. Fartøj ifølge ethvert af de foregående krav, k e n d e t e g n e t ved, at konsollernes (5) øvre afslutningsflade er placeret i niveau med fartøjets dæk (4).
30

7. Fartøj ifølge ethvert af de foregående krav, k e n d e t e g n e t ved, at konsollernes (5) nedre afslutningsflade er placeret i væsentlig afstand til skibets vandlinie og mellem denne og skibets bund.

5 8. Fartøj ifølge ethvert af de foregående krav, k e n d e t e g n e t ved, at første midlerne omfatter en til skroget monteret skinne samt fastgørelsesmidler, eksempelvis bolte (7).

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SAMMENDRAG

Fartøj (1), fortrinsvis et skib, for transport og montage af konstruktioner, hvilket fartøj (1) omfatter et skrog (2) samt mindst fire vertikalt forskydelige støtteben (9) samt forskydningsmidler til forskydning af støttebenene (9). Støttebenene (9) monteres i mindst to konsoller (5), der ved første midler er forbundet hhv. til skrogets (2) højre og venstre langside, og fartøjet (1) omfatter tillige mindst én hjælpekonstruktion, fortrinsvis en kran (11), for håndtering og placering af konstruktionerne under vandlinien.

Herved opnås et fartøj, der med udgangspunkt i et eksisterende fartøj, d.v.s. med alt, hvad dertil hører, gør det muligt at transportere vindmøller samt montere disse møller på forud anlagte konstruktioner på havbunden, og hvor selve vindmøllerejsningen vil ske under samme betingelser på land, og hvor opsætningen kan finde sted via fragtskibe, som er af self supplying-typen. Skibet udgør med andre ord en enhed, der er i stand til at varetage alt omfattende lastning af mølleenhederne, transport af flere mølleenheder til opsætningsstedet, herunder rejsning af denne fra fragtskibet og nedsænkning til den på havbunden formonterede sokkel.

(fig. 2)

PATENT COOPERATION TREATY

MODTAGET

27 AUG 2001

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

Larsen & Birkeholm A/S
Skandinavisk Patentbureau
Banegårdspladsen 1
DK-1570 Copenhagen V
Denmark

PCT

WRITTEN OPINION

(PCT Rule 66)

Date of mailing
(day month year)

23-08-2001

Applicant's or agent's file reference

17391 PCT

REPLY DUE

within 60 days
from the above date of mailing

*mod. i det.**HH*

International application No.

PCT/DK00/00532

International filing date (day month year)

28.09.2000

Priority date (day month year)

28.09.1999

International Patent Classification (IPC) or both national classification and IPC⁷

B63B 27/00, B63B 35/00

Applicant

Thomsen, Kurt Elith

1. This written opinion is the first (first, etc.) drawn by this International Preliminary Examining Authority.
2. This opinion contains indications relating to the following items:
 - I ☒ Basis of the report
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application
3. The applicant is hereby invited to reply to this opinion.

When? See the time limit indicated above. The applicant may, before the expiration of that time limit, request this Authority to grant an extension, see Rule 66.2(d).

How? By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

Also For an additional opportunity to submit amendments, see Rule 66.4.
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4bis.
For an informal communication with the examiner, see Rule 66.6.

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.
4. The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 28.01.2002

Name and mailing address of the IPEA/SE

Patent- och registreringsverket

Box 5055

S-102 42 STOCKHOLM

Facsimile No. 08-667 72 88

Telex

11078

IATREG-S

Authorized officer

Douglas Elliot/EK

Telephone No. 08-782 25 00

WRITTEN OPINION

International application No.

PCT/DK00/00532

I. Basis of the opinion**1. With regard to the elements of the international application:***

- ☒ the international application as originally filed
- ☐ the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the claims:
pages _____, as originally filed
pages _____, as amended (together with any statement) under article 19
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the drawings:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.These elements were available or furnished to this Authority in the following language English which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☒ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the written opinion was drawn on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheet/fig _____

5. ☐ This opinion has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2 (c)).

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed".

WRITTEN OPINION

International application No.

PCT/DK00/00532

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-8</u>	YES
	Claims	_____	NO
Inventive step (IS)	Claims	<u>6-8</u>	YES
	Claims	<u>1-5</u>	NO
Industrial applicability (IA)	Claims	<u>1-8</u>	YES
	Claims	_____	NO

2. Citations and explanations

Documents cited in the International Search Report:

D1: US 4 473 256

D2: US 4 465 012

D1, the closest prior art, discloses a vessel, which is used as a chisel barge. The vessel is equipped with supporting legs to maintain the position of the hull in a fixed location. The supporting legs can move vertically in consoles, which are connected to the deck of the vessel. Furthermore, the vessel has wire winches and hydraulic systems to control the height of the legs. The vessel is also divided into internal bulkheads spaced along the length and width of the hollow interior.

Claim 1 differs from D1 in that the consoles are connected to the hull's right and left long side instead of the corners. The position of the vessel is fixed whether the legs are connected to the sides or in the corners. This is considered obvious to a person skilled in the art and is therefore not considered to involve an inventive step.

To have sleeves coated with a friction reducing substance on the inner surface of the sleeves, to have load cells connected to the supporting legs and to have a control system for filling or emptying water in the hollow spaces in the hull, is obvious to a person skilled in the art.

The invention according to claims 1-5 is thus novel but is not considered to involve an inventive step.

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To: Larsen & Birkeholm A/S Skandinavisk Patentbureau Banegårdspladsen 1 DK-1570 Copenhagen V Denmark		<div style="text-align: center;"> MODTAGE 21 DEC 2001 Larsen & Birkeholm A/S </div> <div style="text-align: center;"> NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY EXAMINATION REPORT </div> <div style="text-align: right;"> (PCT Rule 71.1) </div>		
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 60%;"> Date of mailing <i>(day/month/year)</i> </td> <td style="width: 40%; text-align: center;"> 19-12-2001 </td> </tr> </table>		Date of mailing <i>(day/month/year)</i>	19-12-2001	
Date of mailing <i>(day/month/year)</i>	19-12-2001			
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"> Applicant's or agent's file reference 17391 PCT </td> <td style="width: 50%; text-align: center;"> IMPORTANT NOTIFICATION </td> </tr> </table>		Applicant's or agent's file reference 17391 PCT	IMPORTANT NOTIFICATION	
Applicant's or agent's file reference 17391 PCT	IMPORTANT NOTIFICATION			
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;"> International application No. PCT/DK00/00532 </td> <td style="width: 33%;"> International filing date <i>(day/month/year)</i> 28-09-2000 </td> <td style="width: 33%;"> Priority date <i>(day/month/year)</i> 28-09-1999 </td> </tr> </table>		International application No. PCT/DK00/00532	International filing date <i>(day/month/year)</i> 28-09-2000	Priority date <i>(day/month/year)</i> 28-09-1999
International application No. PCT/DK00/00532	International filing date <i>(day/month/year)</i> 28-09-2000	Priority date <i>(day/month/year)</i> 28-09-1999		
Applicant Thomsen, Kurt Elith				

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/ Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88	Telex 17978 PATOREG-S	Authorized officer <div style="text-align: center;"> </div> Telephone No. 08-782 25 00
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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 17391 PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/DK00/00532	International filing date (<i>day/month/year</i>) 28.09.2000	Priority date (<i>day/month/year</i>) 28.09.1999
International Patent Classification (IPC) or national classification and IPC ₇ B63B 27/00, B63B 35/00		
Applicant Thomsen, Kurt Elith		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 24.04.2001	Date of completion of this report 12.12.2001
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88	Authorized officer Douglas Elliot/LS Telephone No. 08-782 25 00

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/DK00/00532

I. Basis of the report**1. With regard to the elements of the international application:***

- ☐ the international application as originally filed
- ☒ the description:
pages 1-9, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☒ the claims:
pages _____, as originally filed
pages _____, as amended (together with any statement) under article 19
pages _____, filed with the demand
pages 11-12, filed with the letter of 12.10.2001
- ☒ the drawings:
pages 1-5, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____
- ☐ the sequence listing part of the description:
pages _____, as originally filed
pages _____, filed with the demand
pages _____, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.These elements were available or furnished to this Authority in the following language English which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☒ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheet/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2 (c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item I and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/DK00/00532

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	<u>1-8</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-8</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-8</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Documents cited in the International Search Report:

D1: US 4 473 256

D2: US 4 465 012

D1, the closest prior art, discloses a vessel, which is used as a chisel barge. The vessel is equipped with supporting legs to maintain the position of the hull in a fixed location. The supporting legs can move vertically in consoles, which are connected to the deck of the vessel. Furthermore, the vessel has wire winches and hydraulic systems to control the height of the legs. The vessel is also divided into internal bulkheads spaced along the length and width of the hollow interior.

Claim 1 differs from D1 in that the consoles are connected to the hull's right and left long side instead of the corners. Furthermore, a crane not mentioned in D1 is used for handling and placing the structures below the waterline.

The invention according to claims 1-8 is thus novel, considered to involve an inventive step and have industrial applicability.

AMENDED PATENT CLAIMS

1. Vessel (1), preferably a ship, for transport and mounting of structures,
said vessel (1) comprising a hull (2) and at least four vertically ele-
5 vational support legs (9) as well as displacement means for elevating
the support legs (9) **characterized** in that the support legs (9) are
mounted in at least two consoles (5) which by first means are connected
to the hull's (2) right and left long side, respectively, and where the ves-
sel (1) also comprises at least one crane (11), for handling and placing
10 the structures below the waterline.
2. Vessel according to claim 1, **characterized** in that the consoles (5)
comprise at least one sleeve (14) coated with a friction reducing sub-
stance on the inner surfaces of the sleeves, said inner surfaces enclos-
15 ing parts of the outer circumference of a support leg (9).
3. Vessel according to any of the preceding claims **characterized** in that
the displacement means comprise at least one wire winch (8) attached
to each support leg (9) and a hydraulic system attached thereto.
20
4. Vessel according to any of the preceding claims **characterized** in that
the support legs each comprise load cells (13).
5. Vessel according to any of the preceding claims **characterized** in that
25 there are provided hollow spaces/chambers (12) in the hull (2), said
hollow spaces/chambers being filled with/emptied for water via a control
system.
6. Vessel according to any of the preceding claims **characterized** in that
30 upper end surface of the consoles (5) is placed on a level with the deck
(4) of the vessel.

7. Vessel according to any of the preceding claims **characterized** in that lower end surface of the consoles (5) is placed at a considerable distance to the ship's waterline and between same and the ship's bottom.

5

8. Vessel according to any of the preceding claims **characterized** in that the first means comprise a rail secured to the hull and fastening means, for example bolts.